

## **Anatomy of the Biosphere**

*Imagining a New Living Being - The Biosphere 3*



*There was a time when the universe was full of celestial bodies, but our earth was not in it. And there were times when our land was created, but there were no plants or animals on it. Well, there were times when there were various plants and various animals on land, but there were no people.*





*Finally, the first people appeared, but it was so long ago that even the oldest history does not remember them. All those times lasted for a very long time, so it seems that the land had to go through a lot of change, while opportunities were created on it in which people could live and prosper. During these changes, the plant and animal world changed the most, until it finally got its most perfect creature in the shape of a man. (Jovan Žujović- The Stone Age, 1893)*

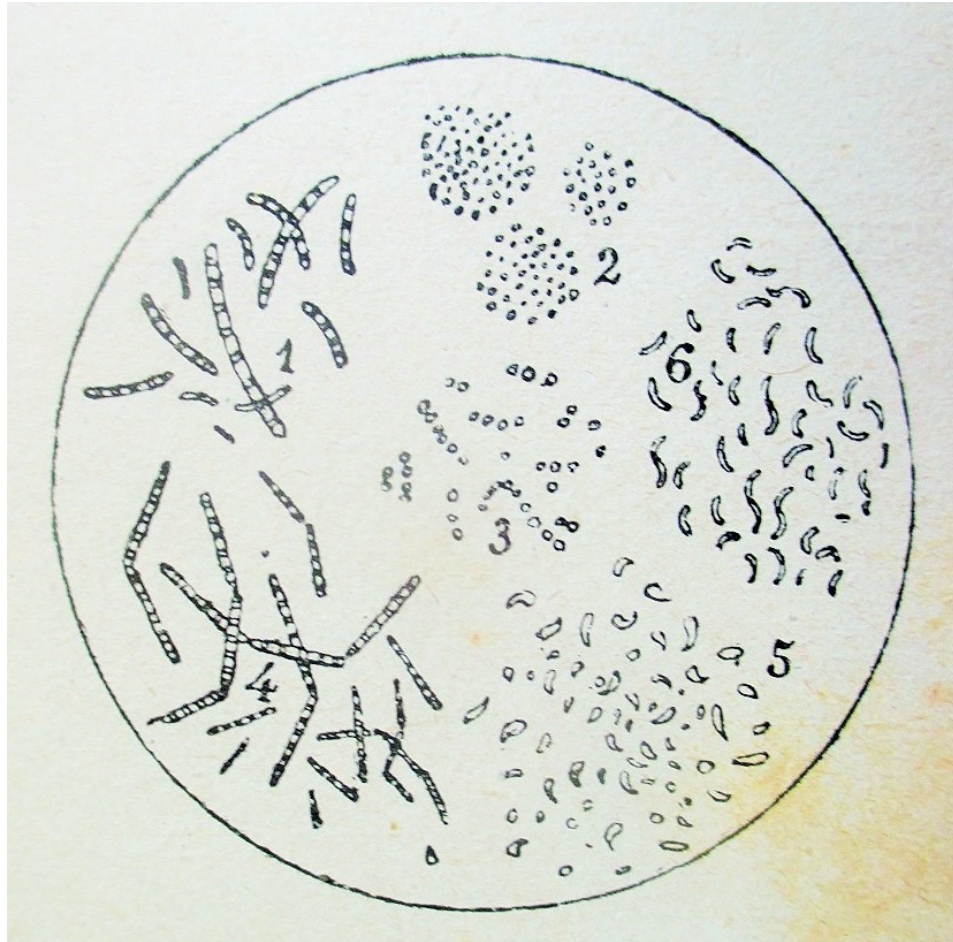




MANUFACTURE OF FLINT IMPLEMENTS BY PREHISTORIC MAN.—Drawn by Emile Bayard.

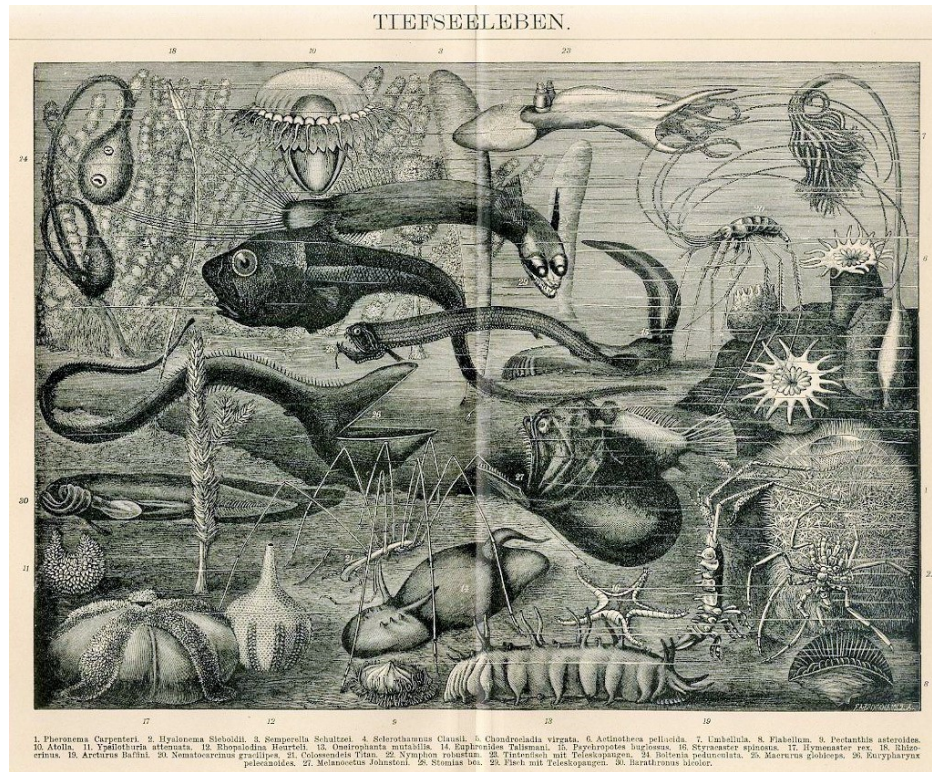
### ***Living-nonliving***

The earliest proto-living molecule that could self-replicate and transform from nonliving to living, also had to have an “impulse” to do so, to possess some kind of “will” to implement this property for self-preservation and continuation of its existence. What would be this “property” that was nudging the self-replicating proto-RNA to reproduce itself and actively looking for better condition to keep replicating and survive? This would be some kind of “unknown property” that at this point seems not possible to identify/explain. A living organism that just died is the same as while it was alive, but what exactly have changed to turn it into a dead matter? Also, in case of a nonliving molecule in the moment when it becomes alive, what **has** changed?



A pebble usually doesn't move to the river bank and jumps in by itself, but a frog does and then also jumps out. There is a certain "self-initiative" ("will") in living matter that non-living, including the current stage of AI, does not have. This seems to be a property of all life from the earliest living matter, a property that distinguishes it from the non-living matter. Erwin Schrödinger seems to be correct identifying anti-entropy as an important property of life. It is necessary but seems not to be sufficient. Emergence of a star is an anti-entropic process but this doesn't make it alive. Anti-entropy seems to be a good description of one of life's main property, but it doesn't explain the origin of the "will" to move in that direction.





On the Biosphere level, all the waters on Earth are part of its interior/body, like the water in our body. There are various results how deep life could be found. Some theoretical estimates suggest life might survive at least 10 kilometers into the crust and on the other side also 10km up in the atmosphere. These two surfaces are imperfect concentric spheres with 20km distance between them. They are not (yet) formed as clear separations between living and nonliving areas as the cell membrane. On the other hand, being quite different, they rather resemble the bordering surface of a complex organism with skin and digestive system. Human external surface is its skin, while the internal surface is its intestines. They both separate and protect the body interior from the outside world while enabling the exchange of energy between them.

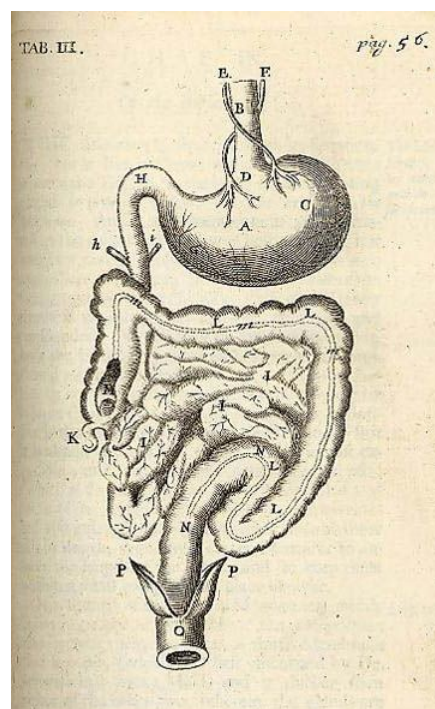
### ***Metabolism***

Most of complex living organisms have their digestive system placed inside their body as a pipe with the mouth as an entrance, going through intestines and ends with the rectum as the exit. Although it is placed inside the body, the interior of this pipe is in fact the outside world and intestines are another skin. Skin and lungs are

external part of the exchange between an organism and the world around it. In a way there is a similarity between this structure and the Biosphere body.

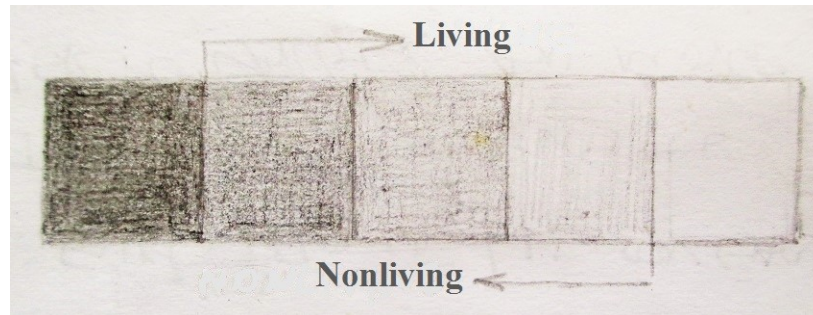


Biosphere also has two kinds of skin, one (internal) facing the crust beneath it and another (external) is bordering the atmosphere. The most of vital exchange happening between the living belt and the crust is going through “internal skin” similarly to the intestines, while oxygen and sunlight is coming through the “external skin”. Only in this case there is no clear separation between intake of food and the discarding the waste produced in the process. The distance between these two skins of the Biosphere is so small in comparison with its surface that the entire body of the Biosphere is in fact just a spherical surface with two different sides.

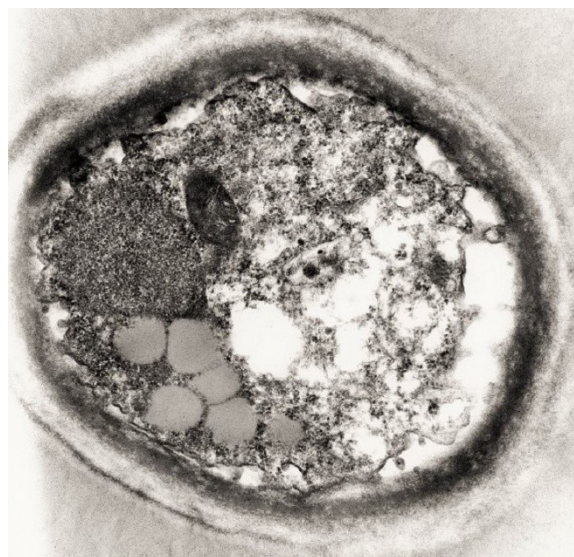




As stated above, in case of the Biosphere its external surface bordering the atmosphere resembles the skin (and lungs), while the internal surface inside the crust is similar to our intestines. However, over the larger sphere there is no clear separating tissue with the atmosphere, while over the smaller surface is the exchange of heat, food and waste between crust and the Biosphere's through countless mouths, digestive systems and anuses of most of the individual living organisms.



Instead of binary relationship between inside-outside, or dead-alive, perhaps it might make more sense to represent them, not in two but in five stages. White would represent the cell inside with no contact with outside world. Light gray is also the cell inside but close to the membrane, taking part in exchange with the outside world. Gray would mark the membrane as the threshold between two states living and nonliving. Dark-gray is nonliving but close to membrane from the outside taking part in exchange with the cell and Black would be nonliving environment far away from the membrane.



**Membrane** *I cannot consider the organism without its environment...from a formal point of view the two may be regarded as equivalent phases between which dynamic contact is maintained by the membrane that separate and link them.*”  
(Peter Mitchell, *International Symposium on the Origin of Life*, Moscow 1957)

If organism and its environment are two “equivalent phases” separated by the membrane they also represent living and nonliving spaces separated and connected by membrane/threshold. Thus the membrane seems to be both living and nonliving. However, from the position of living we could see/know/recognize nonliving, but reverse is not possible. Nonliving cannot see the living which means that living is meta-nonliving.

Perhaps the time would come when humans will make some kind of semitransparent solar sphere around entire Earth and thus establish a physical membrane on that side of the Biosphere’s body. It is most likely that in the future development of the Biosphere humans will play the most important role on many fields, including possible emergence of its consciousness that would be based on human brains and global network.





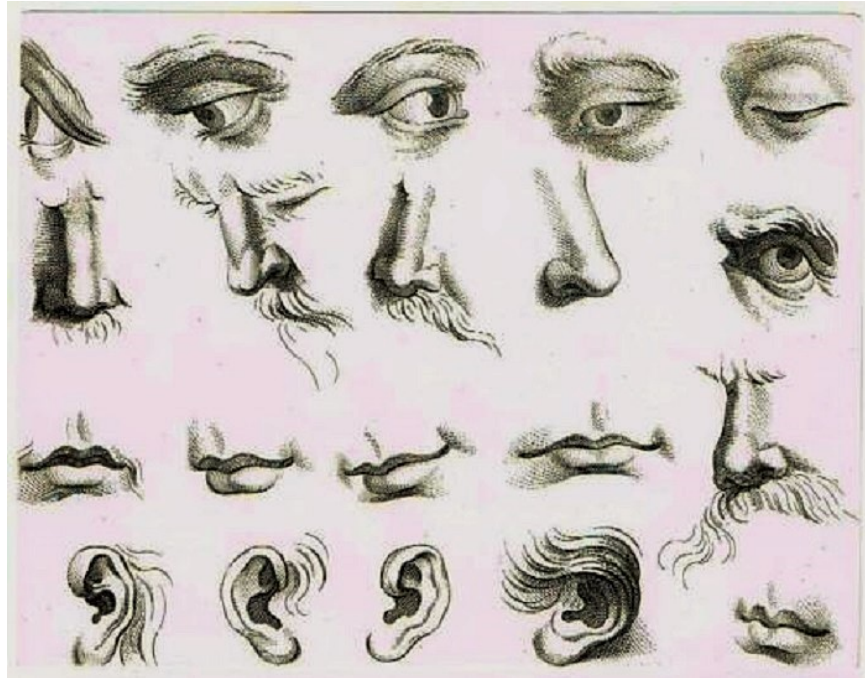
**Temperature** The basic temperature differences on the Biosphere body is between two halves of the external sphere with one its half exposed to sun (day, warm) and another part hidden from sun (night-cold). The internal sphere hidden in the crust is getting warmth from the Earth's core. There will be local temperature variations coming from a certain larger areas on land or sea, active volcanoes and from larger groups of living entities.

**Motion** Biosphere is moving through space attached to Earth. Its closest neighbor is the Moon with its gravitational and light effects while the most visible and influential body on all life that makes the Biosphere is the Sun. All the movements within the body of the Biosphere are internal expressions of its properties as a living being.



**Perception/senses touch** - if the Biosphere will have some kind of sense of touch it will manifest itself through the sensors of its constitutive living parts, to feel/register/sense changes happening on the larger scale: rain, tornado, flood, earthquake,...





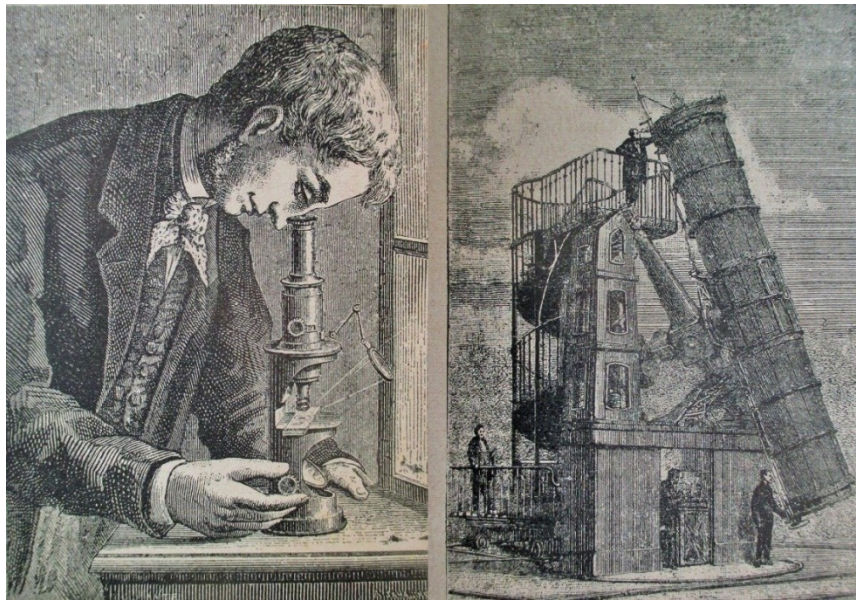
**smell** - similarly it will be able to sense changes on the larger scale, like smoke from a larger fire, air pollution...

**sound**- could be heard through various organs specialized to register vibrations of air, water or crust, by countless living organisms.



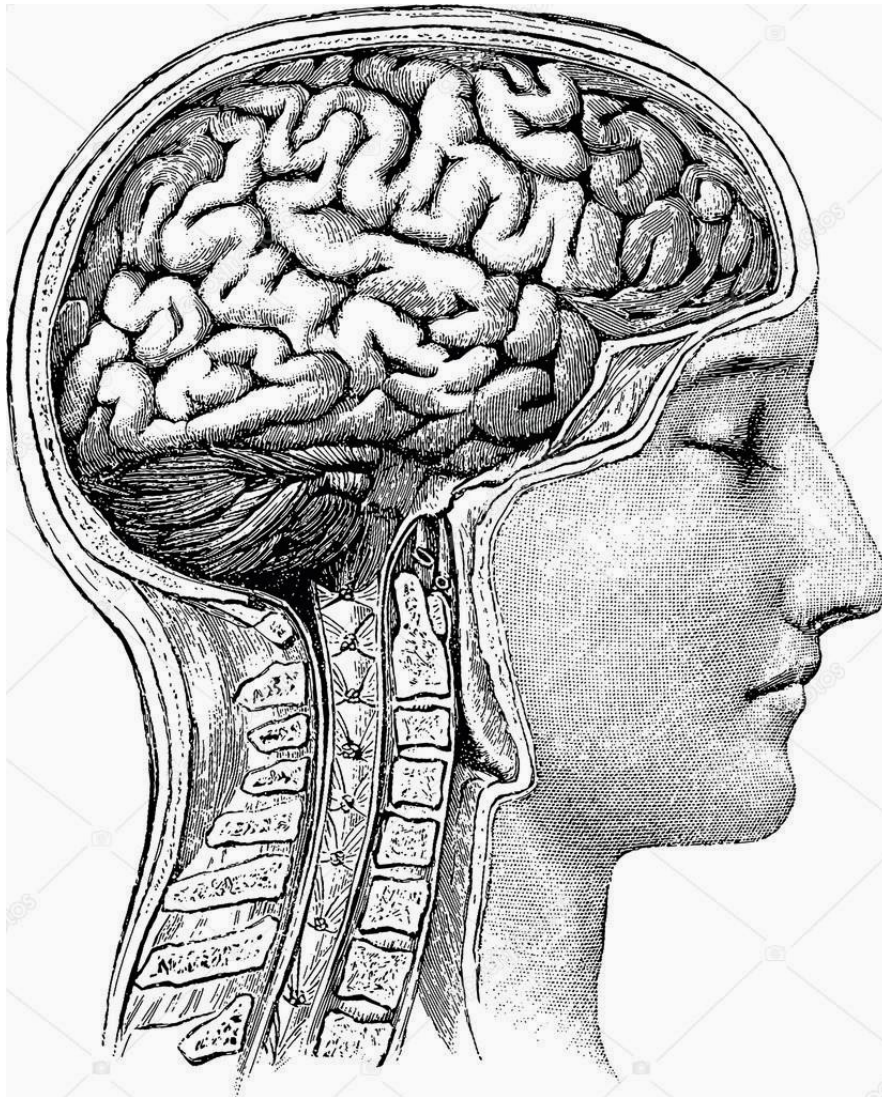


**sight/vision**—Biosphere would have a composite, mosaic like, picture of the world coming from the eyes/brains of all living beings, something like a giant Argus Panoptes. In fact, this would resemble an eye as a single complex organ consisting of numerous parts including 125 million retina cells. It would be able to see/"know" which part of its body is exposed to the Sun and which is in the dark. Its visual experience will be a combination of the external and internal. External would be on one side daylight, Sun, blue sky, clouds, darkness of the night, Moon, stars... Through human eyes using microscope and telescope it will be able to see the very small and very distant objects.



## ***Memory***

Various kinds of memories are vital property of any living organism. Memory is an anti-entropic phenomenon without which there is no observation/interaction with the external world. It is of course quite uncertain what would be the Biosphere memory and how it will relate to its individual components,

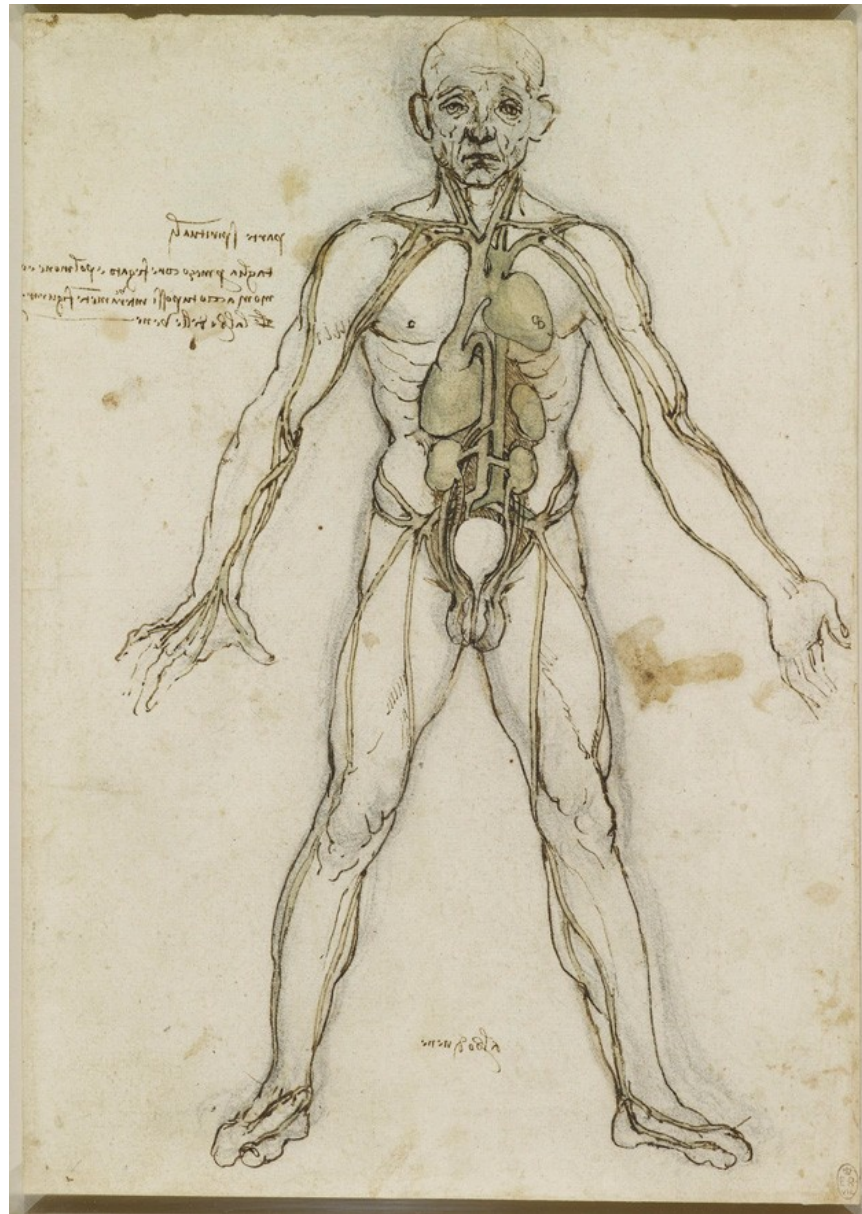


## ***Intelligence - natural or/and artificial***

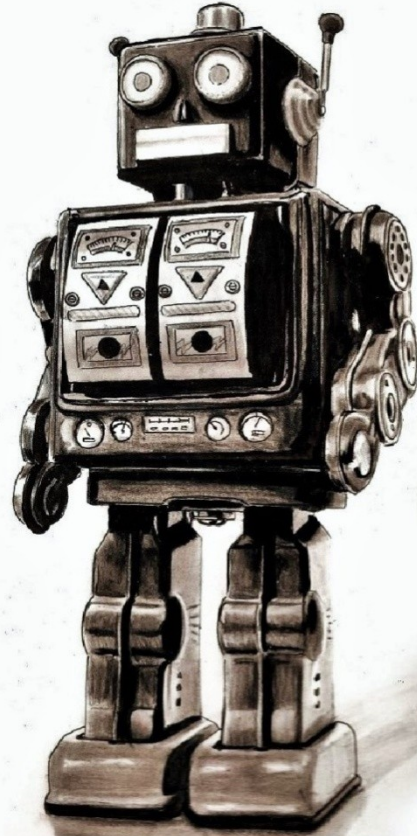
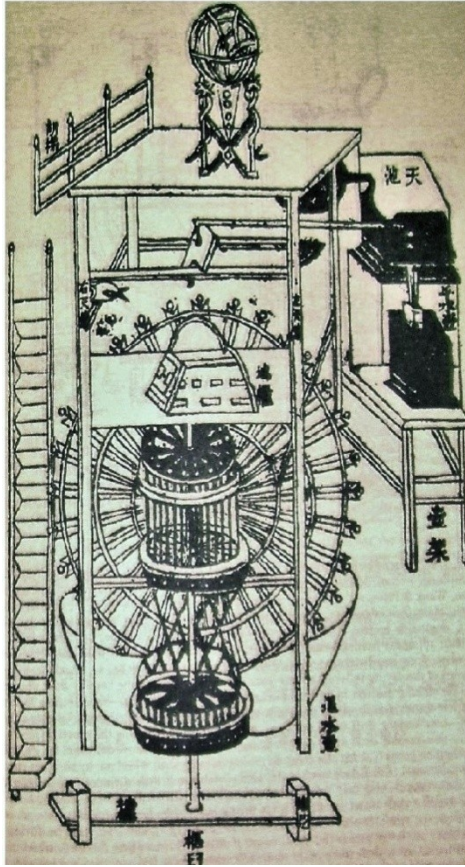
It is a question if the notion “intelligence” characteristic for a certain kind of living matter (including humans) is applicable on non-living matter. Perhaps in that case instead of “intelligence” more appropriate would be some other term like, for



example, “algorithm”. Intelligence also includes capacity to lie, pretend, act, do stupid things intentionally or come up with crazy ideas...



*Intelligence can be described as the ability to perceive or infer information, and to retain it as knowledge to be applied towards adaptive behaviors within an environment or context. Intelligence is most often studied in humans but has also been observed in both non-human animals and in plants despite controversy as to whether some of these forms of life exhibit intelligence. Intelligence in computers or other machines is called artificial intelligence. (Wiki)*



Since the Biosphere is and will be quite a complex organism, it is almost certain that will acquire some kind of intelligence as a single being (entity). Although it will be dominated by the human component of its being, it will include some other living beings as well. However, how this intelligence will manifest itself is hard to anticipate or imagine at this point. In addition to possible self-awareness, it might be able to acquire some other properties unknown even unimaginable to us.

***Self-awareness*** There are two ways how the emergence of the Biosphere as a single living being could be understood. One, that it is the latest stage of the evolution of life on Earth that began some 4 billion years ago, from smallest and simplest organisms to the larger and more complex. Another would be, that entire development of life was just an embryonic growth of the largest the most complex living being on Earth.





As mentioned above, in addition to having a certain degree of living intelligence, it is possible that at some point it become aware of its own existence (self-awareness), acquiring a capacity to see itself, not only from within, but from without as well. This process already seems begin happening a few decades ago with the space program, when small number of humans were able to see the Earth from the space and the Moon, thus enabling the Biosphere to see itself from the outside as whole.

### *Nature-culture*

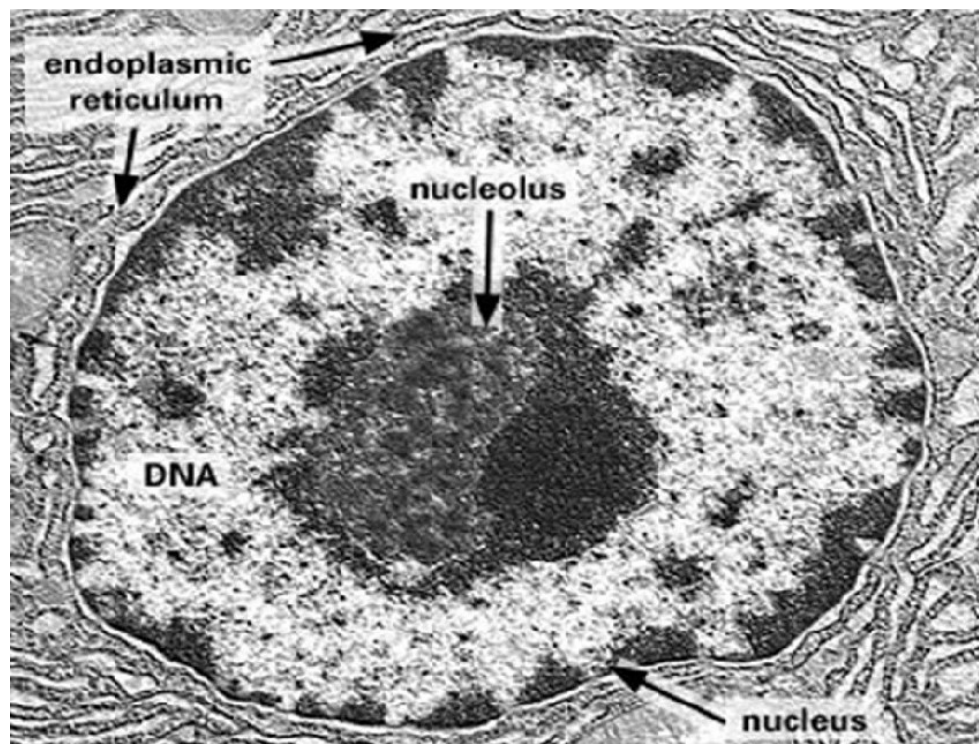
It might be interesting to mention that there are also some similarities between the structure of a cell or living tissue with the structures made by humans.

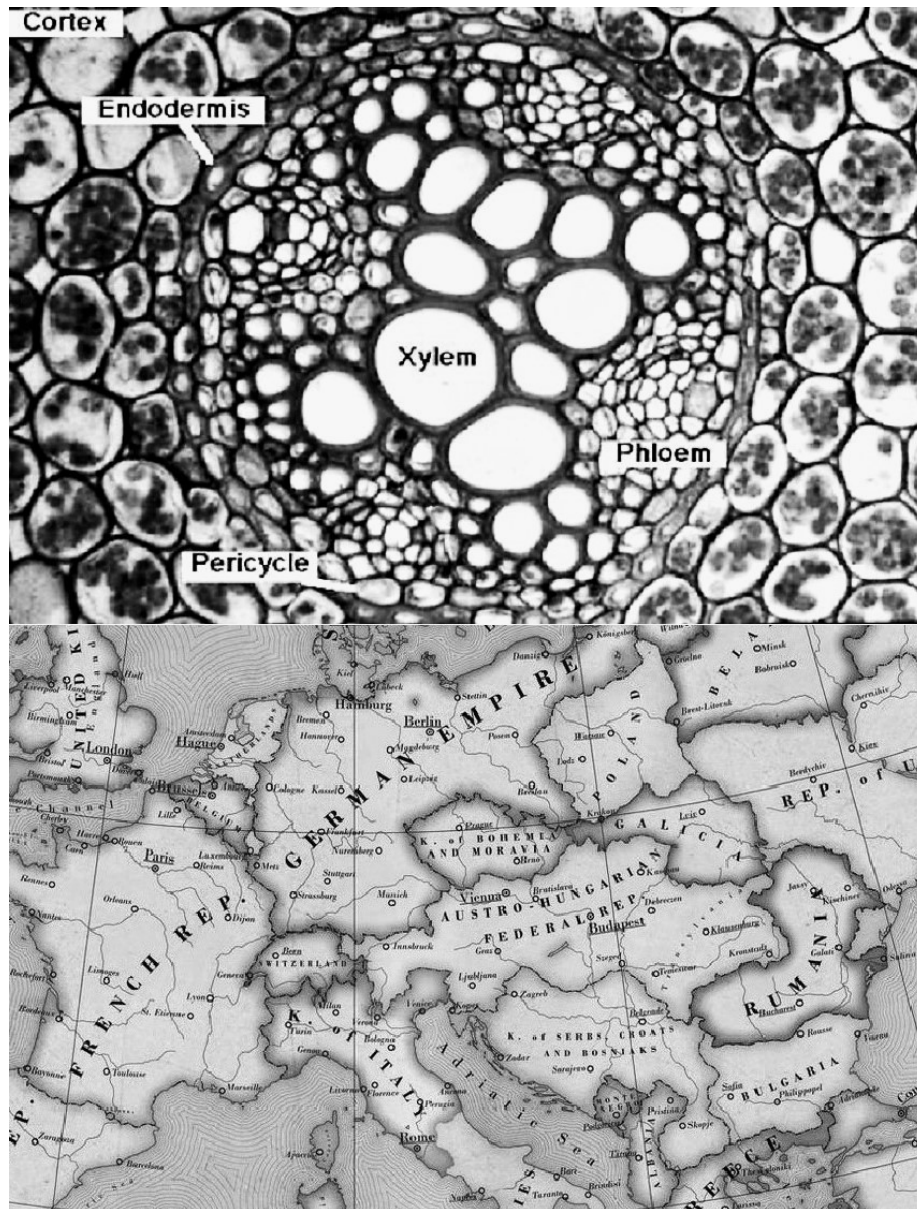
Conceptually, the entire room/house could correspond to cell. Even the threshold of the house is a special cultural/symbolic membrane that separates and links the spaces inside the house and outside world. Furthermore, in some cultures it was a custom to burry dead under the threshold thus turning it into a symbolic membrane



between living and nonliving. The first separation is horizontal (inside-outside), while the second is vertical (dead-below, living-above). Also, the walls of a castle resemble a cell membrane. Space inside the walls is protected and safe while outside it is uncertain and potentially dangerous (pale and beyond the pale). Even the very term “cell”, introduced for human made structure (monk’s cell as Robert Hooke noticed), is now describing the building blocks of the entire living world. Similar structure could be recognized in case of village or city and even country with its borders. These are all organizations of living matter on the larger scales that on one hand resemble/reflect properties of smaller organisms, and on another are integral parts/components of the largest living entity on Earth - the Biosphere.







The question is if these social/cultural phenomena have its origins in the human biology. For some time I thought that what we call “nature” is one of the expressions of “culture”. Simply, when we name “Sun”, “Moon”, “tree”, “mouse”, we are turning these phenomena that are around us into, what we call “culture”. In a way all what we perceive as natural phenomena are in fact a subset of a broader notion that is (human) culture. However, it seems that the relationship is inverse, that all what we call culture are one specific kind of expression of nature through living beings called humans. Thus, it is not the “nature” that is “culture” but it is “culture” that is “nature”. In other words, all aspects of social organization of human beings: economy, politics, education, science, technology, communications,



art, museums, sport,...are in essence biological categories, they are human components/tissue of the Biosphere. And the next main narrative/canon should not be based on the concepts of religion or nation, but interwoven around the story of life, including humans as its backbone. It is also the human tissue of the Biosphere that will stretch the tentacles of life beyond the Earth.

Gregor Mobius 11.03.2021

